

<b>Notice of Allowability</b>	<b>Application No.</b>	<b>Applicant(s)</b>	
	09/448,175	HSU ET AL.	
	Examiner Curtis B. Odom	Art Unit 2634	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS. This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1.  This communication is responsive to RCE filed on 3/16/2006.
2.  The allowed claim(s) is/are 1,3-5 and 7-9.
3.  Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
  - a)  All
  - b)  Some\*
  - c)  None
  1.  Certified copies of the priority documents have been received.
  2.  Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3.  Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

\* Certified copies not received: \_\_\_\_\_.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.  
**THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.**

4.  A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.
5.  CORRECTED DRAWINGS ( as "replacement sheets") must be submitted.
  - (a)  including changes required by the Notice of Draftsperson's Patent Drawing Review ( PTO-948) attached
    - 1)  hereto or 2)  to Paper No./Mail Date 3/12/2003.
  - (b)  including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date \_\_\_\_\_.

Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).
6.  DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

#### Attachment(s)

1.  Notice of References Cited (PTO-892)
2.  Notice of Draftsperson's Patent Drawing Review (PTO-948)
3.  Information Disclosure Statements (PTO-1449 or PTO/SB/08),  
Paper No./Mail Date \_\_\_\_\_
4.  Examiner's Comment Regarding Requirement for Deposit  
of Biological Material
5.  Notice of Informal Patent Application (PTO-152)
6.  Interview Summary (PTO-413),  
Paper No./Mail Date \_\_\_\_\_
7.  Examiner's Amendment/Comment
8.  Examiner's Statement of Reasons for Allowance
9.  Other \_\_\_\_\_.

### **EXAMINER'S AMENDMENT**

1. An examiner's amendment to the record appears below. Should the changes and/or additions be unacceptable to applicant, an amendment may be filed as provided by 37 CFR 1.312. To ensure consideration of such an amendment, it MUST be submitted no later than the payment of the issue fee.

Authorization for this examiner's amendment was given in a telephone interview with John S. Paniaguas on March 28, 2006.

The application has been amended as follows:

Please replace page 7, lines 9-14 of the instant specification with the following:

DFT filter bank 20 is adapted to analyze input signals  $x_0(m) \dots x_1(m) \dots x_{M-1}(m)$ , which are polyphase components of  $X(n)$ , and provide an output signal. Generally, in order to shift the input frequencies by  $\omega$ , the input signals  $x_0(m) \dots x_1(m) \dots x_{M-1}(m)$  are multiplied by a factor  $e^{j\omega n}$ , where  $n$  is a time index of the input signal. This operation results in a generally complex signal, which, in turn, requires a complex filter to process and thus doubles the size of the filter.

This application is in condition for allowance except for the presence of claim 6 directed to an invention non-elected without traverse. Accordingly, claim 6 has been cancelled.

Claim 1 (currently amended). A frequency analyzer for analyzing a plurality of input signals  $x_0(m) \dots x_1(m) \dots x_{M-1}(m)$ , the frequency analyzer comprising:

a plurality of input modulators for modulating and shifting said input signals  $x_0(m) \dots x_1(m) \dots x_{M-1}(m)$ , defining shifted output signals, wherein said plurality of input modulators include a multiplier for multiplying each of said input signals  $x_0(m) \dots x_1(m) \dots x_{M-1}(m)$  by a factor  $e^{j\omega n}$ , where  $n$  is a time index;

a polyphase filter network which includes a plurality of polyphase filters  $p_0(m) \dots p_r(m) \dots p_{M-1}(m)$ , each having a coefficient for receiving said shifted output signals and defining polyphase filter output signals; and

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a plurality of output modulators for modulating the output of said polyphase filters, said frequency analyzer configured to process said plurality of input signals  $x_0(m) \dots x_1(m) \dots x_{M-1}(m)$ , wherein each of said plurality of polyphase filters includes a network coefficient and said output modulators include a multiplier for multiplying the output of each of said polyphase filters by a predetermined factor selected so that said coefficients are real.

Claim 8 (currently amended). A frequency synthesizer for analyzing a plurality of input signals  $x_0(m) \dots x_1(m) \dots x_{M-1}(m)$ , the frequency analyzer comprising:

a plurality of input modulators for modulating and shifting said input signals  $x_0(m) \dots x_1(m) \dots x_{M-1}(m)$ , defining shifted output signals;

a polyphase filter network which includes a plurality of polyphase filters  $p_0(m) \dots p_r(m) \dots p_{M-1}(m)$ , each having a coefficient for receiving said shifted output signals and

defining polyphase filter output signals; and

a plurality of output modulators for modulating the output of said polyphase filters, said frequency synthesizer configured to combine said polyphase filter output signals and provide a single output signal, said output modulators include a multiplier for multiplying the output of each of said plurality of polyphase filters  $p_o(m) \dots p_p(m) \dots p_{M-1}(n)$  by a predetermined factor selected so that said coefficients are real.

#### **EXAMINER'S STATEMENTS OF REASONS FOR ALLOWANCE**

2. The following is an examiner's statement of reasons for allowance: Claims 1, 3-5, and 7-9 are allowable over prior art references because related references do not disclose input modulators which multiply input signals by a modulation factor, a polyphase filter network connected to the modulators, and output modulators connected to the polyphase filters which multiply the outputs of the polyphase filters by a predetermined factor so that the coefficients of the filter are real.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

*Conclusion*

Art Unit: 2634

3. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Fields et al. (U. S. Patent No. 6, 085, 077) discloses a polyphase filter bank which also includes multiplying the output of a polyphase filter bank by modulation factor.

4. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Curtis B. Odom whose telephone number is 571-272-3046. The examiner can normally be reached on Monday- Friday, 8-5.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jay Patel can be reached on 571-272-2988. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Curtis Odom  
March 28, 2006



JAY K. PATEL  
SUPERVISORY PATENT EXAMINER